What is claimed is:

1. An image display apparatus comprising:

a single image forming device which forms an original image; and

a first optical system and a second optical system which are disposed on both sides of a central plane which includes a central axis of the image forming device, the first optical system guiding light from the image forming device to a first eye of an observer placed near a pupil of the first optical system, and the second optical system guiding light from the image forming device to a second eye of the observer placed near a pupil of the second optical system,

wherein, when light traveling from the image forming device to each of the pupils is inversely traced from the pupil, each of the first and second optical systems includes:

a first surface which reflects the inversely traced light from the pupil in a direction away from the central plane; and

a second surface which reflects the inversely traced light from the first surface in a direction away from the central plane.

2. The image display apparatus according to claim 1, wherein the first and second optical systems are arranged in mirror symmetry with respect to the central plane.

3. The image display apparatus according to claim 1, wherein each of the first and second optical systems is arranged in plane

symmetry with respect to a plane perpendicular to the central plane.

4. The image display apparatus according to claim 1, wherein each of the first and second optical systems includes a plurality of reflective surfaces including the first and second surfaces, and at least one of the plurality of reflective surfaces is a decentered curved surface.

5. The image display apparatus according to claim 1, wherein each of the first and second optical systems includes a plurality of reflective surfaces including the first and second surfaces, and at least one of the plurality of reflective surfaces is a rotationally asymmetric surface.

6. The image display apparatus according to claim 1, wherein intermediate image is formed from light from the image forming device within each of the first and second optical systems.

7. The image display apparatus according to claim 1, wherein each of the first and second optical systems includes a third surface which reflects the inversely traced light reflected by the second surface back to the second surface.

8. An image display apparatus comprising:

a single image forming device which forms an original image; and

a first optical system and a second optical system, the first optical system guiding light from the image forming device to a first eye of an observer, and the second optical system guiding light from the image forming device to a second eye of the observer,

wherein each of the first and second optical systems includes:

a first surface which reflects light from the image forming device; and

a second surface which reflects the light from the first surface back to the first surface,

wherein the first surface again reflects the light from the second surface.

9. The image display apparatus according to claim 8, wherein the first optical system and the second optical system are disposed on both sides of a central plane which includes a central axis of the image forming device,

and the first optical system and the second optical system are arranged in mirror symmetry with respect to the central plane.

10. The image display apparatus according to claim 8, wherein the first optical system and the second optical system are disposed on both sides of a central plane which includes a central axis of the image forming device,

and each of the first optical system and the second optical system is arranged in plane symmetry with respect to a plane

perpendicular to the central plane.

11. The image display apparatus according to claim 8, wherein each of the first and second optical systems includes a plurality of reflective surfaces including the first and second surfaces, and at least one of the plurality of reflective surfaces is a decentered curved surface.

12. The image display apparatus according to claim 8, wherein each of the first and second optical systems includes a plurality of reflective surfaces including the first and second surfaces, and at least one of the plurality of reflective surfaces is a rotationally asymmetric surface.

13. The image display apparatus according to claim 8, wherein intermediate image is formed from light from the image forming device within each of the first and second optical systems.

14. The image display apparatus according to claim 8, wherein each of the first and second optical systems includes an optical element which has the first and second reflective surfaces formed integrally on a transparent body, and at least one optical surface of the optical element serves as an internal total reflection surface and a transmissive surface depending on an incident angle of light.

15. The image display apparatus according to claim 8, wherein

the following expression is satisfied when a ray traveling from the center of an original image forming area of the image forming device to the center of a pupil of each of the first and second optical systems is defined as a central principal ray:

$$\theta < 45°$$

where θ represents an angle formed between the central principal ray as an incident ray on the second surface and the central principal ray as a reflected ray from the second surface when the central principal ray reflected by the first surface is incident on the second surface, reflected by the second surface, and then travels back toward the first surface.

16. An image display system comprising:

the image display apparatus according to claim 1; and

an image information supply apparatus which supplies image information for enabling the image forming device to form an original image to the image display apparatus.

17. An image display system comprising:

the image display apparatus according to claim 8; and

an image information supply apparatus which supplies image information for enabling the image forming device to form an original image to the image display apparatus.